<u>IN THE CLAIMS (as amended During International Preliminary Examination)</u>:

Please amend the claims as follows:

1. (Currently Amended) A method for ~~the production of~~ <u>producing</u> a spherical or grain-shaped semiconductor element ~~(11)~~ for use in a solar cell, ~~characterized by~~ <u>comprising</u> the ~~following~~ steps <u>of</u>:

~~• application of~~ <u>applying</u> a conductive back contact layer ~~(30)~~ onto a spherical or grain-shaped substrate core ~~(20)~~;

~~• application of~~ <u>applying</u> a first precursor layer ~~(40) made of~~ <u>comprising</u> copper or copper gallium;

~~• application of~~ <u>applying</u> a second precursor layer ~~(50) made of~~ <u>comprising</u> indium; <u>and</u>

~~• reaction of~~ <u>reacting</u> the precursor layers ~~(40) and (50)~~ with sulfur and/or selenium to form a I-III-VI compound semiconductor, ~~whereby the~~ <u>by carrying out the</u> reaction of the layer structure ~~(10) is carried out~~ in a melt of the reaction element sulfur or selenium, or <u>carrying out</u> the reaction of the layer structure ~~(10) is carried out~~ in hydrogen compounds of the reaction element sulfur or selenium, ~~whereby~~ <u>carrying out</u> the reaction in hydrogen compounds ~~is carried out~~ at <u>or below</u> atmospheric pressure ~~or at a pressure lower than atmospheric pressure~~.

2. (Currently Amended) The method according to claim 1, ~~characterized in that~~ <u>wherein</u> the main constituent of the conductive back contact layer ~~(30)~~ is molybdenum.

3. (Currently Amended) The method according to claim 2, ~~characterized in that~~ <u>wherein</u> the conductive back contact layer ~~(30)~~ contains up to 20% by weight of gallium in order to improve ~~the~~ adhesion.

4. (Currently Amended) The method according to ~~one or more of the preceding claims~~ claim 1, ~~characterized in that~~ comprising applying each of the layers ~~(30; 40; 50) are each applied~~ by ~~means of~~ a PVD or CVD ~~methods~~ method.

5. (Currently Amended) The method according to one ~~or more of the preceding claims~~ claim 1, ~~characterized in that~~ comprising alloys on a layer structure ~~(10)~~ comprising precursor layers ~~(40; 50) is alloyed~~ at a temperature of T > 220°C [> 428°F] prior to the reaction to form a I-III-VI compound semiconductor.

6. (Currently Amended) The method according to ~~one or more of the preceding claims~~ claim 1, ~~characterized in that~~ comprising carrying out a treatment with a KCN solution ~~is carried out~~ after ~~the reaction of~~ reatcing the layer structure ~~(10)~~ to form a I-III-VI compound semiconductor.

7. (Currently Amended) The method according to ~~one or more of the preceding claims~~ claim 1, ~~characterized in that~~ comprising depositing a buffer layer ~~is deposited~~ after ~~the reaction of~~ reacting the layer structure ~~(10)~~ to form a I-III-VI compound semiconductor.

8. (Currently Amended) The method according to ~~one or more of the preceding claims~~ claim 1, ~~characterized in that~~ comprising depositing a high-resistance ZnO layer and a low-resistance ZnO layer ~~are deposited~~ after ~~the reaction of~~ reacting the layer structure ~~(10)~~ to form a I-III-VI compound semiconductor.

9. (Currently Amended) The method according to ~~one or both of the preceding claims~~ claim 7 ~~and 8~~, ~~characterized in that~~ comprising depositing the buffer layer and/or the high-resistance and the low-resistance layers ~~are deposited~~ by ~~means of~~ a PVD or CVD ~~methods~~ method.

10. (Currently Amended) A spherical or grain-shaped semiconductor element for use in solar cells, ~~characterized in that~~ wherein the semiconductor element ~~(11)~~ has a spherical or grain-shaped substrate core ~~(20)~~ that ~~consists of~~ comprising soda-lime glass and ~~that~~ is coated at least with one back contact layer ~~(30) made of~~ comprising molybdenum and ~~with~~ one I-III-VI compound semiconductor.

11. (Currently Amended) The semiconductor element according to claim 10, ~~characterized in that~~ wherein the diameter of the substrate core ~~(20)~~ is in the order of magnitude of 0.1 mm to 1 mm, ~~especially approximately 0.2 mm~~.

12. (Currently Amended) The semiconductor element according to ~~one or more of claims~~ claim 10 ~~and 11~~, ~~characterized in that~~ wherein the thickness of the back contact layer ~~(30)~~ is in the order of magnitude of 0.1 μm to 1 μm.

13. (Currently Amended) The semiconductor element according to ~~one or more of claims~~ claim 10 ~~to 12~~, ~~characterized in that~~ wherein the I-III-VI compound semiconductor layer ~~(60) consists of~~ comprising a compound ~~from~~ selected from the group consisting of ~~the~~ copper indium sulfides, copper indium diselenides, copper indium gallium sulfides ~~or~~, and copper indium gallium diselenides.

14. (Currently Amended) The semiconductor element according to ~~one or more of claims~~ claim 10 ~~to 13~~, ~~characterized in that~~ wherein the thickness of the I-III-VI compound semiconductor layer ~~(60)~~ is in the order of magnitude of 1 μm to 3 μm.

15. (Currently Amended) The semiconductor element according to ~~one or more of claims~~ claim 10 ~~to 14~~, ~~characterized in that~~ wherein the semiconductor element ~~(11)~~ has a buffer layer above the I-III-VI compound semiconductor layer ~~(60)~~.

16. (Currently Amended) The semiconductor element according to claim 15, ~~characterized in that~~ wherein the buffer layer ~~consists of~~ comprises a material selected from the group ~~comprising~~ consisting of CdS, ZnS, ZnSe, ZnO, indium selenium compounds or indium sulfur compounds.

17. (Currently Amended) The semiconductor element according to ~~one or both of claims~~ claim 15 ~~and 16~~, ~~characterized in that~~ wherein the thickness of the buffer layer is in the order of magnitude of 20 nm to 200 nm.

18. (Currently Amended) The semiconductor element according to ~~one or more of claims~~ claim 10 ~~to 17~~, ~~characterized in that~~ wherein the semiconductor element has a high-resistance and a low-resistance ZnO layer above the I-III-VI compound semiconductor layer ~~(60)~~.

19. (Currently Amended) The semiconductor element according to claim 18, ~~characterized in that~~ wherein the thickness of the high-resistance layer is in the order of

magnitude of 10 nm to 100 nm, ~~whereas and~~ which the thickness of the low-resistance ZnO layer is in the order of magnitude of 0.1 μm to 2 μm.

20. (Currently Amended) The semiconductor element according to ~~one or more of claims~~ claim 10 ~~to 19~~, ~~characterized in that~~ wherein the semiconductor element ~~(11) was~~ is produced by a method according to ~~one or more of claims~~ claim 1 ~~to 9~~.

21. (Currently Amended) A method for ~~the production of~~ producing a solar cell having integrated spherical or grain-shaped semiconductor elements, ~~characterized by~~ comprising the ~~following features~~ steps of:

~~•~~ ~~incorporation of~~ incorporating several spherical or grain-shaped semiconductor elements ~~(11)~~ into an insulating support layer ~~(70), whereby~~, wherein the semiconductor elements ~~(11)~~ protrude from the surface of the support layer on at least one side of the support layer, and the semiconductor elements ~~(11)~~ each ~~consist of~~ comprise a spherical or grain-shaped substrate core ~~(20)~~ that is coated at least with one conductive back contact layer ~~(30)~~ and with one I-III-VI compound semiconductor layer ~~(60)~~;

~~•~~ ~~removal of~~ removing parts of the semiconductor elements ~~(11)~~ on one side of the support layer ~~(70)~~ so that a surface of the conductive back contact layer ~~(30)~~ of the semiconductor elements ~~(11)~~ is exposed;

~~•~~ ~~application of~~ applying a back contact layer ~~(80)~~ onto ~~the~~ a side of the support layer ~~(70)~~ on which parts of the semiconductor elements ~~(11)~~ have been removed; and

~~•~~ ~~application of~~ applying a front contact layer ~~(90)~~ onto the side of the support layer ~~(70)~~ on which no semiconductor elements ~~(11)~~ have been removed.

22. (Currently Amended) The method according to claim 21, ~~characterized in that~~ comprising, in addition to parts of the semiconductor elements ~~(11)~~, removing part of the support layer ~~(70) is also removed~~.

23. (Currently Amended) The method according to ~~one or both of claims~~ claim 21 ~~and 22~~, ~~characterized in that~~ comprising applying the semiconductor elements ~~(11) are applied~~ onto the support layer ~~(70)~~ by ~~means of~~ scattering, dusting and/or printing and ~~they are~~ subsequently incorporated the semiconductor elements into the support layer.

24. (Currently Amended) The method according to ~~one or more of claims~~ claim 21 ~~to 23~~, ~~characterized in that~~ comprising configuring the support layer ~~(70) is configured~~ as a matrix with recesses into which the semiconductor elements ~~(11)~~ are incorporated.

25. (Currently Amended) The method according to ~~one or more of claims~~ claim 21 ~~to 24~~, ~~characterized in that~~ comprising incorporating the semiconductor elements ~~(11) are incorporated~~ into the support layer ~~(70)~~ by ~~means of~~ a heating and/or pressing procedure.

26. (Currently Amended) The method according to ~~one or more of claims~~ claim 21 ~~to 25~~, ~~characterized in that the removal of~~ comprising removing the semiconductor elements ~~(11)~~ and/or ~~of~~ the support layer ~~(70) is done~~ by grinding, polishing, etching, thermal energy input ~~and/or by~~ or a photolithographic ~~processes~~ process.

27. (Currently Amended) The method according to ~~one or more of claims~~ claim 21 ~~to 26~~, ~~characterized in that~~ comprising depositing the back contact layer ~~(80)~~ and/or the

front contact layer ~~(90) are deposited~~ by a PVD or CVD ~~methods~~ method or by ~~methods~~ another method adapted to the material of the layer in question.

28. (Currently Amended) A solar cell having integrated spherical or grain-shaped semiconductor elements, ~~characterized in that the solar cell has at least the following features~~ comprising:

[[•]] an insulating support layer ~~(70)~~ into which the spherical or grain-shaped semiconductor elements ~~(11)~~ are incorporated, ~~whereby~~ wherein the semiconductor elements ~~(11)~~ protrude from the layer on at least one side of the support layer ~~(70)~~, and the semiconductor elements ~~(11)~~ each ~~consist of~~ comprising a spherical or grain-shaped substrate core ~~(20)~~ that is coated at least with one conductive back contact layer ~~(30)~~ and with one I-III-VI compound semiconductor layer;

[[•]] a back contact layer ~~(80)~~ on one side of the support layer ~~(70), whereby several~~, wherein a plurality of semiconductor elements ~~(11)~~ on this side of the support layer have a surface that is free of I-III-VI compound semiconductors; and

[[•]] a front contact layer ~~(90)~~ on the side of the support layer ~~(70)~~ on which the semiconductor elements ~~(11)~~ do not have a surface that is free of I-III-VI compound semiconductors.

29. (Currently Amended) The solar cell according to claim 28, ~~characterized in that it is~~ produced by ~~means of~~ a method ~~according to one or more of claims 21 to 27~~ comprising the steps of:

incorporating several spherical or grain-shaped semiconductor elements into an insulating support layer, wherein the semiconductor elements protrude from the surface of the support layer on at least one side of the support layer, and the semiconductor elements each

comprise a spherical or grain-shaped substrate core that is coated at least with one conductive back contact layer and with one I-III-VI compound semiconductor layer;

removing parts of the semiconductor elements on one side of the support layer so that a surface of the conductive back contact layer of the semiconductor elements is exposed;

applying a back contact layer onto a side of the support layer on which parts of the semiconductor elements have been removed; and

applying a front contact layer onto the side of the support layer on which no semiconductor elements have been removed.

30. (Currently Amended) The solar cell according to ~~one or both of claims~~ claim 28 ~~and 29~~, ~~characterized in that~~ wherein the insulating support layer ~~(70) consists of~~ comprises a thermoplastic material.

31. (Currently Amended) The solar cell according to ~~one or more of the preceding claims~~ claim 28 ~~to 30~~, ~~characterized in that~~ wherein the support layer ~~(10) consists of~~ comprises a polymer selected from the group consisting of ~~the~~ epoxides, polycarbonates, polyesters, polyurethanes, polyacrylics ~~and/or~~, and polyimides.

32. (Currently Amended) The solar cell according to ~~one or more of the preceding claims~~ claim 28 ~~to 31~~, ~~characterized in that~~ wherein the spherical or grain-shaped semiconductor elements ~~(11)~~ are semiconductor elements ~~according to one or more of claims 10 to 20~~, wherein the semiconductor element has a spherical or grain-shaped substrate core comprising soda-lime glass and coated at least with one back contact layer comprising molybdenum and one I-III-VI compound semiconductor.

33. (Currently Amended) The solar cell according to ~~one or more of claims~~ claim 28 ~~to 32~~, ~~characterized in that~~ wherein the semiconductor elements ~~(11)~~ are coated with a I-III-VI compound semiconductor selected from the group consisting of ~~the~~ copper indium diselenides, copper indium disulfides, copper indium gallium diselenides and copper indium gallium diselenide disulfides.

34. (Currently Amended) The solar cell according to ~~one or more of claims~~ claim 28 ~~to 33~~, ~~characterized in that~~ wherein the front contact layer ~~(90) consists of~~ comprises a conductive material.

35. (Currently Amended) The solar cell according to claim 34, ~~characterized in that~~ wherein the front contact layer ~~(90) consists of~~ comprises a transparent conductive oxide (TCO).

36. (Currently Amended) The solar cell according to ~~one or more of claims~~ claim 28 ~~to 35~~, ~~characterized in that~~ wherein the back contact layer ~~(80) consists of~~ comprises a conductive material.

37. (Currently Amended) The solar cell according to claim 36, ~~characterized in that~~ wherein the back contact layer ~~(80) consists of~~ comprises a metal, a transparent conductive oxide (TCO) or a polymer having conductive particles.

38. (Currently Amended) The solar cell according to claim 37, ~~characterized in that~~ wherein the back contact layer ~~(80) consists of~~ comprises a polymer selected from the group consisting of ~~the~~ epoxy resins, polyurethanes and/or polyimides having conductive

particles selected from ~~a~~ the group ~~comprising~~ consisting of carbon, indium, nickel, molybdenum, iron, nickel chromium, silver, aluminum ~~and/or the~~ and corresponding alloys or oxides.

39. (Currently Amended) The solar cell according to claim 38, characterized in that wherein the back contact layer ~~(80) consists of~~ comprises an intrinsic conductive polymer.

40. (Currently Amended) A photovoltaic module, ~~characterized in that it has~~ comprising at least one solar cell according to ~~one or more of claims~~ claim 28 ~~to 39~~.

41. (New) The semiconductor element according to claim 10, wherein the diameter of the substrate core is in the order of magnitude approximately 0.2 mm.